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EXAMINER

CHANG, EDITH M

ART UNIT	PAPER NUMBER
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2637

DATE MAILED: 05/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/549,368	Applicant(s) ENDRES ET AL.	
	Examiner Edith M. Chang	Art Unit 2637	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,9-11 and 19-35 is/are rejected.
- 7) ☒ Claim(s) 2-8 and 12-18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 April 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>20041207</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments/Remarks

1. The Applicant's remarks filed on December 07, 2004 have been fully considered. The rejections of claims 1, 9, 11 and 19-35 are upheld, and the claims 2-8 and 12-18 are objected to as being dependent upon rejected base claims.

Claim Objections

2. Claims 2-8, 10, 13-17 and 20 are objected to because of the following informalities:

Claim 2, line 5: "said steps comprising" is suggested changed to "the steps of switching further comprising"; line 12: "when said quality of said second" is suggested changed to "when said second".

Claim 3, line 1: "wherein said signal" is suggested changed to "wherein said individual signal"; line 4: "a box of" is suggested changed to "a square".

Claim 4, line 1: "wherein said signal" is suggested changed to "wherein said individual signal"; line 5: "a box of" is suggested changed to "a square".

Claim 5, line 3: "centered on said second" is suggested changed to "centered on a second".

Claim 6, line 3: "a box centered on the" is suggested changed to "a square centered on a".

Claim 7, line 3: "of said region of" is suggested changed to "of said square region of".

Claim 10, line 4: "said least means" is suggested changed to "the least means".

Claim 13, line 2: "wherein said signal" is suggested changed to "wherein said individual signal"; line 5: "a box of" is suggested changed to "a square of".

Claim 14, line 4: "wherein said signal" is suggested changed to "wherein said individual signal"; line 6: "a box of" is suggested changed to "a square of"; line 7: ", square region of" is suggested changed to ", said square region of".

Claim 15, line 4: "on said second" is suggested changed to "on a second".

Claim 16, lines 3-4: "a box centered on the" is suggested changed to "a square centered on a".

Claim 17, line 2: "including evaluating" is suggested changed to "including means for evaluating"; line 4: "said region" is suggested changed to "said square region"; line 5: "a block" is suggested changed to "said block".

Claim 20, line 2: "including evaluating" is suggested changed to "including means for evaluating".

Claim 8 is dependent on the objected claim 4.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 9, 11, 19, 21-23, and 29-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Strolle et al. (US 5,872,815).

Regarding **claims 1, 11 & 21**, in FIG.1, Stolle et al. teaches a receiver comprising a LPF 106 (or matched filter 110) responsive to the received signal, an adaptive equalizer 112, and a quantizer 116. In FIG.7, Strolle et al. teaches the detail diagram of the adaptive equalizer and part of the receiver, wherein the decision feedback equalizer (DFE 910) receives the samples from the multiplexer 906. The multiplexer 906 is controlled to couple the output of the combiner 904 (as the soft decision samples) to the DFE 910 during the signal acquisition period (as the first mode, column 13 lines 17-22), and coupled the decisions from the quantizer 16 (as hard decision samples) to DFE 901 during the operating mode of tracking changing channel conditions (as the second mode, column 16 lines 47-54). The received signal is sampled by the A/D CLK 126 (FIG.1) and received signal samples/symbols mapped to the constellation plan (FIG.9 & 10) that the multiplex 906 switches between the two modes to provide the samples to DFE on an individual sample by sample basis.

Regarding **claims 9 & 19**, Strolle et al. discloses the first mode is a signal acquisition mode using the soft decision samples and constant modulus algorithm to update the error terms of the feedback equalizer filter (column 13 lines 14-25).

Regarding **claims 22-23, & 29-30**, Strolle et al. discloses the algorithm (CMA) used in the one mode (as the first mode) of the two modes (column 2 lines 47-53).

Claim Rejections - 35 USC § 103

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5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 10, 20, 24-25, 27-28, 31-32, and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strolle et al. (US 5872815) in view of Paik et al. (US Patent 5363408).

Regarding **claims 10 & 20**, Strolle et al. does not explicitly specify using the least means squared (LMS) algorithm in hard decision. However Paik et al. teaches the Decision Directed (DD-MSL) in the tracking mode (80 FIG.6, FIG.9; column 8 lines 58-60, column 8 line 67-column 9 line 1). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the LMS algorithm in the tracking taught by Paik et al. in Strolle et al.'s equalizer's second mode to deal the ISI problem (column 1 lines 45-60) for the purpose of having a data reliable system (column 3 lines 48-52).

Regarding **claims 24 & 31**, Strolle et al. does not specify the algorithm used in the one mode (as the first mode) of the two modes as the LMS. However Paik et al. teaches the first mode is a LMS (column 8 lines 45-50). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the Paik et al.'s teaching in the Strolle et al.'s equalizer where the LMS as the first mode of the two modes to deal the ISI problem (column 1 lines 45-60) for the purpose of having a data reliable system (column 3 lines 48-52).

Regarding **claims 25, 27, 32, & 34**, except specify the algorithm used in the second mode, Strolle et al. discloses all subject matter claimed. Paik et al. teaches the samples stored in the CMA PROM as the CMA used in one mode (132 FIG.9), and the samples stored in the LMS

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PROM (134 FIG.9) as the LMS used in the other mode. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the Paik et al.'s LMS teaching in the second mode of the Strolle et al.'s equalizer to deal the ISI problem (column 1 lines 45-60 '408) for the purpose of having a data reliable system (column 3 lines 48-52).

Regarding **claims 28 & 35**, Strolle et al. does not specify the algorithm used in each mode. However, in FIG. 9 and column 8 lines 46-53, Paik et al. teaches the samples stored in the CMA PROM as the CMA used in one mode (132 FIG.9, column 8 lines 50-54), and the samples stored in the LMS PROM (134 FIG.9, column 8 lines 58-60) as the LMS used in the other mode. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the Paik et al.'s teaching in the Strolle et al.'s equalizer where the CMA in the first mode with soft decision (904-906 FIG.7 '815) and LMS algorithm in the second mode with hard decision (116-906 FIG.7 '815) to deal the ISI problem (column 1 lines 45-60 '408) for the purpose of having a data reliable system (column 3 lines 48-52).

7. Claims 26 & 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strolle et al. (US 5872815) in view of Paik et al. (US Patent 5363408), as applied to claims 25 & 33 above, further in view of Takeuchi et al. (US Patent 6289046 B1).

Regarding **claims 26 & 33**, further Takeuchi et al. teaches the CMA used in the hard decision i.e. the second mode (24, 37 FIG.2; column 7 lines 34-39, column 9 lines 30-35). At the time of the invention, it would have been obvious to a person of ordinary skill in the art to have the CMA taught by Takeuchi et al. in the Strolle et al.'s equalizer hard decision mode to remove the ISI (column 1 lines 9-20).

Allowable Subject Matter

8. Claims 2-8 and 12-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims, and overcome the objections set forth in this office action.

9. The following is a statement of reasons for the indication of allowable subject matter:

Claims are allowable over prior art of record because the prior art of record does not teach or suggest, alone or in a combination, among other things, at least a method or apparatus for operating the feedback equalizer filter as a whole, the combination of elements and features as claimed, which includes switching from said second mode to said first mode responsive to a first individual signal sample including measuring the quality level of individual signal samples in the hard decision and soft decision samples; coupling the soft decision samples to the feedback equalizer filter when the quality level is at a first quality level; coupling the hard decision samples when the quality level is at a second quality level, wherein the second quality level is greater than the first quality level.

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Edith M. Chang whose telephone number is 571-272-3041. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jayanti Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Edith Chang
April 28, 2005


YOUNG T. TSE
PRIMARY EXAMINER